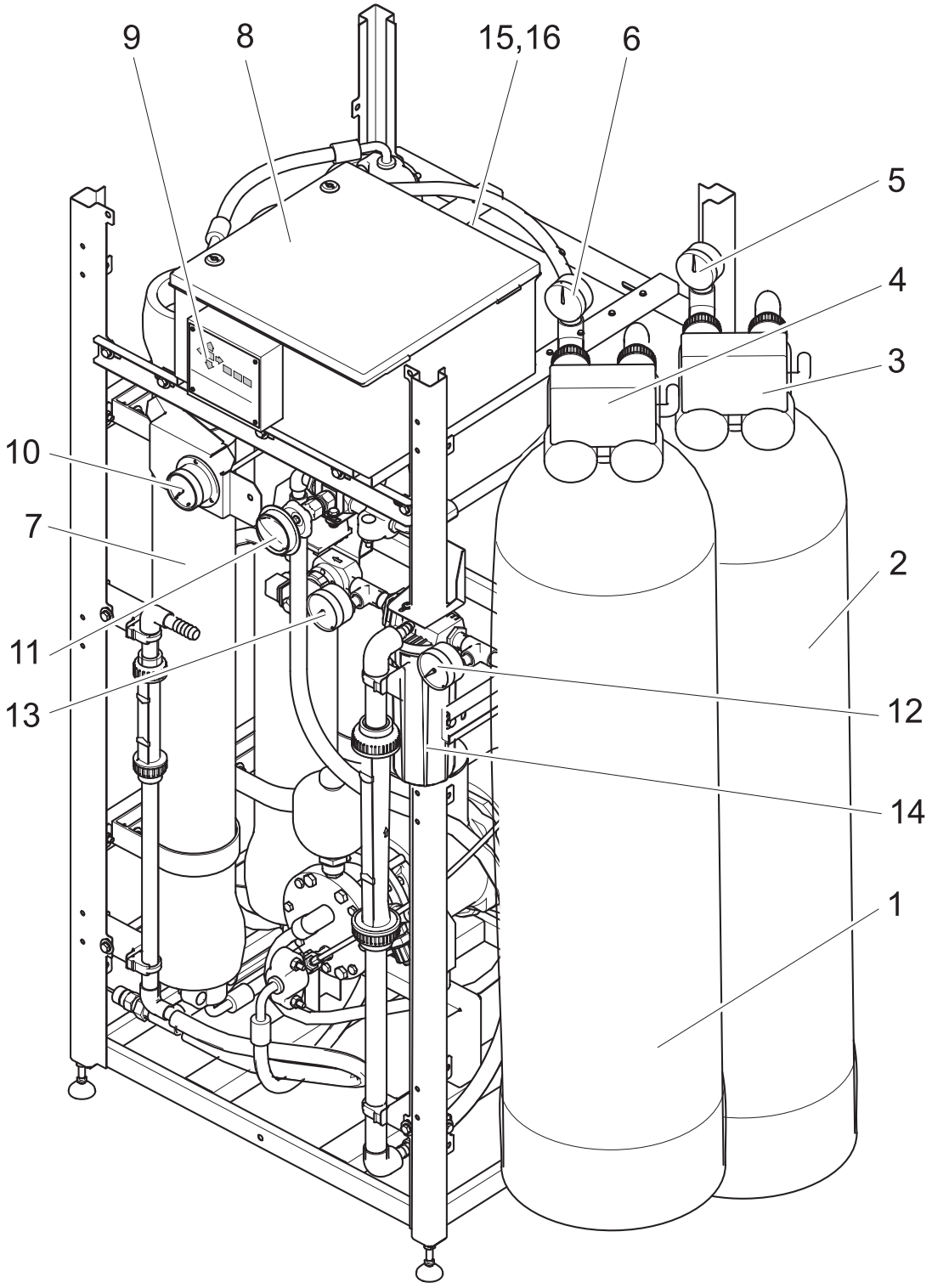
Operating Instructions

WPC 600 SW-AM 1.024-302.0, 1.024-303.0, 1.024-304.0

WPC 600 PI-BW 1.024-105.0

WTC 600 CD 1.024-104.0

BTA 5.961-732.0
ETL 5.640-033.0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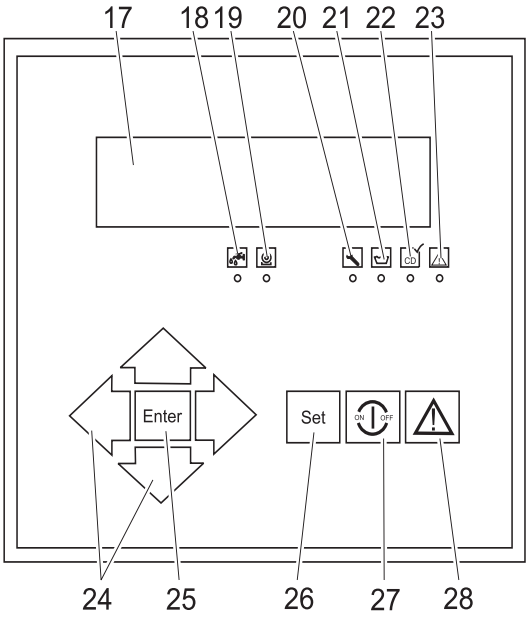

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Equipment Components

1 Media filter
2 Activated carbon filter
3 Control, activated carbon filter
4 Control, media filter
5 Manometer, media filter supply pressure
6 Manometer, activated carbon filter supply pressure
7 RO filter unit
8 Switch box
9 Control panel
10 Manometer, pump pressure
11 Pressure control valve
12 Manometer, fine filter supply pressure
13 Manometer, fine filter output pressure
14 Fine filter unit
15 Power outlets, sand and activated carbon filter
16 Power outlets (3x) for metering stations
17 Display
18 LED "Supply valve active"
19 LED "High pressure pump active"
20 LED "Maintenance"
21 LED "Cehmical metering active"
22 LED "CD" (Conducting capacity too high)
23 LED "Malfunctions"
24 Navigation button
25 ENTER-button
26 SET-button
27 ON/OFF-button
28 QUIT-button

	The packaging material can be recycled. Please do not place the packaging into the ordinary refuse for disposal, but arrange for the proper recycling.
	Old appliances contain valuable materials that can be recycled. Please arrange for the proper recycling of old appliances. Batteries, oil, and similar substances must not enter the environment. Please dispose of your old appliances using appropriate collection systems.

1 Safety Notes

Safe operation of the equipment is possible only when the operating instructions and safety notes are read completely, and the instructions contained therein are strictly followed.

Drinking Water

- ❑ Drinking water quality is ensured only when the equipment is controlled within the scheduled periods. Observe the given control intervals.
- ❑ Have the drinking water quality checked in regular intervals; the valid drinking water regulations are to be observed.

Chemicals

- ❑ Wear acid-resistant protective clothing (goggles and gloves).
- ❑ Store chemicals cool and dry, however, not below 5 °C.
- ❑ Keep chemicals at locations not accessible for children.
- ❑ Ensure good room ventilation and provide a washing facility.
- ❑ Have eye wash bottle readily available.
- ❑ Note the security advices from EU data sheet as well as the accident procedures sheet of the concerned chemicals.

Electrical Equipment

- ❑ Work on the electrical equipment is to be carried out only by skilled persons for electrical work.
- ❑ Never touch damaged or cut through mains cables; pull the mains plug immediately, as required.
- ❑ Never operate the equipment with a damaged cable.

2 Intended Use

This equipment is designed for treatment of seawater or salted ground water.

Depending on the untreated water quality, the modular set-up enables secure separation of turbid materials, water hardeners, salts and bacteria/virus.

3 Maintenance and Care

The equipment may be put into operation only when set-up, installed and prepared for operation by skilled and authorized personnel.

3.1 Starting Operation

Before starting operation:

- Make sure that the equipment is connected to the untreated water source and the respective transporting gear, e. g., admission-pressure unit.
- Ensure the unrestricted flow of the drinking water into a tank or a suitable device on the user side.

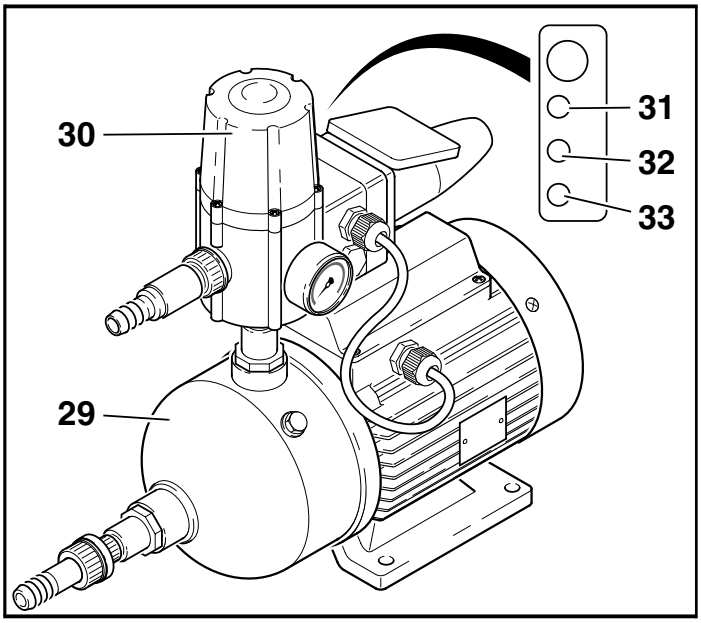
The drinking water must be able to run off without counterpressure. The height difference must not exceed 3 m.

3.1.1 Admission-pressure Unit

In case an admission-pressure unit is necessary, it will be installed by a Kärcher service technician.

The admission-pressure unit consists of a pump (29) and a control device (30). The operating condition of the pump is indicated with three indicator lights:

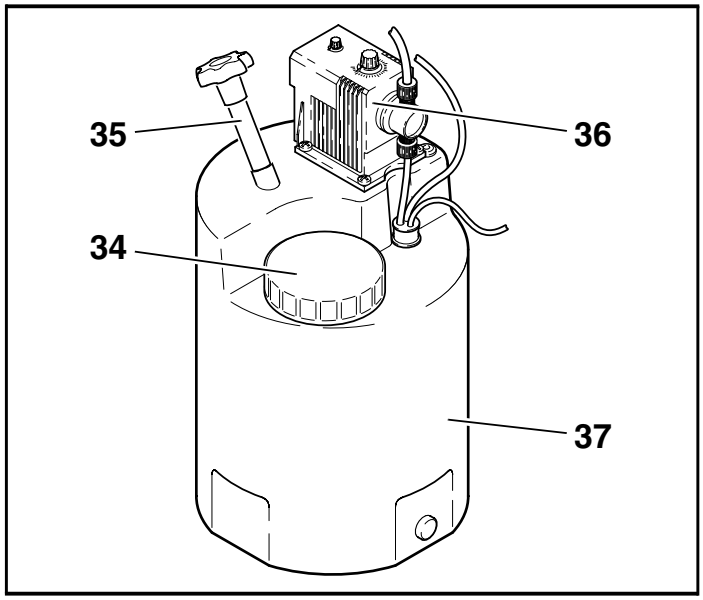
- Green (31): Ready for operation
- Yellow (32): Pump delivering
- Red (33): Malfunction or water low



3.1.2 Filling the Metering Stations

If the system is equipped with one or more metering stations, it must be ensured that these are correctly filled and connected.

- Put on protective clothing.
- Open the lid (34) of the metering station (37).



- Fill the respective chemical into the metering station according to Section 3.2.6.

The metering stations must not be mixed up or mistaken, meaning filled with the wrong chemical.

- Add the corresponding amount of rinking water from WPC 600 SW.
- Shut the lid of the metering station.
- Pull the mixing rod (35) out of the metering station to the stop and push back in again. Repeat this procedure for approx. 5 minutes until the chemical is completely mixed.

If the metering container was completely empty, the metering pump (36) may have possibly drawn in air. In this case, bleed the air from the pump as described in Section 3.2.3.

3.1.3 Switching On the Equipment

- Check wheter the pumps of the metering stations as well as the controller of the sand an activated carbon filter are connected with the power supply.
- Connect the equipment with the socket.
- The equipment starts automatically, if an external float switch is installed and requests water demand. If there is no float switch, the equipment can be started by pushing the ON/OFF button on the control panel.

3.1.4 Operating Indicators

Display of the controls (3 / 4) of the **sand and activated carbon filters**:

- Display of the time
- LED line: Display of the weekday

Control of the **RO system**:

The following is alternately indicated on the two-line display of the control panel (9) of the RO system:

- Display power failure:

Power failure set clock !

This display appears, if the connection to the mains supply is interrupted (such as the plug is removed from the socket or power failure.

- Standby modus:

Standby 243µS/cm 21°C

- After adjusting the time the equipment is in the standby modus.

3.2 During Operation

Drinking water quality is ensured only when the following control intervals are met. In case deviations from the desired condition can not be eliminated through the measures mentioned, the drinking water production must be stopped and the Kärcher Service must be notified.

3.2.1 Control and Corrective Action Intervals

d…daily, w…weekly, m… monthly

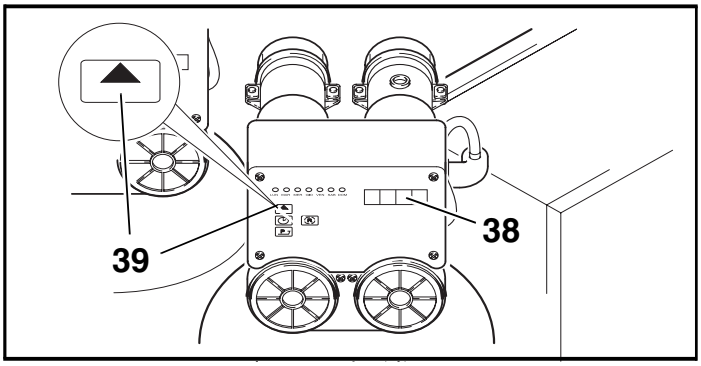
Interval	Check/Activity	Target/Purpose	In Case of Deviation
d	Level, metering container	Sufficient amount/filling	Fill up; mixing chemicals, see Section 3.2.6
	Air bubbles in metering line	No air bubbles	Bleed metering pump, see Section 3.2.3
	Flow of drinking water based on the operational start-up value	Reduction of the drinking water flow up to 10 %	Fine adjustment, see Section 3.2.5 (1)
	Drinking water conductance value based on the operational start-up value	Increase of the drinking water conductance value up to 10 %	Fine adjustment, see Section 3.2.5 (2)
	Pressure difference between pump and concentrate pressure	15 % maximum above start-up difference	See Section 3.2.5 (3) Kärcher Service
	Hour meter for sand und activated carbon filter *	Backwashing has occurred within the past 24 h	Kärcher Service
	Pressure difference, fine filter	≥ 0,8 bar	Replace fine filter, see Section 3.2.4
	Visual inspection of the equipment	No leakage	Kärcher Service
w	Fill out operating log		
m	Clean and flush the metering container		
	Visually check the untreated water pump	No damages/leaks detectable	Kärcher Service
	Float switch in the drinking water tank	No operational malfunctions detectable	Kärcher Service

* for switching over the indication, see Section 3.2.2

3.2.2 Sand and Activated Carbon Filter

During operation, the sand and activated carbon filter control indicates the actual time. To change the indication:

- Press button (39) for approx. 5 s; the display (38) indicates the time of the regeneration.
- Press button (39) briefly; the display indicates the number of regenerations.
- Press button (39) briefly; the display indicates the number of days and hours since the last regeneration.
- After a while the indication moves back to the current time.



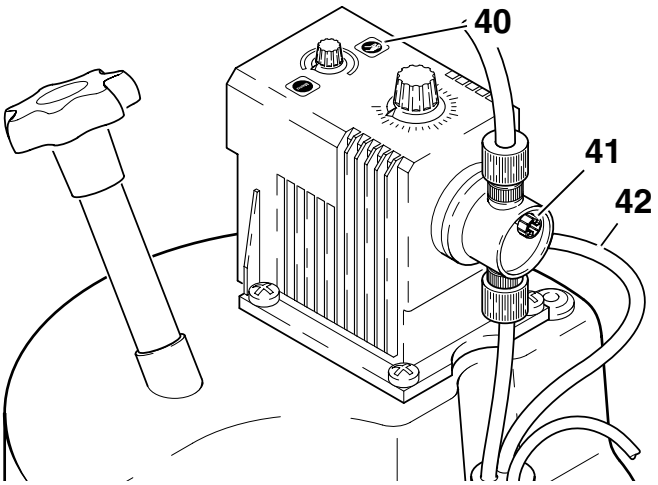
3.2.3 Bleeding the Metering Pump

The metering pump must be bled when the pump has drawn in air (e. g., because the metering container is completely empty).

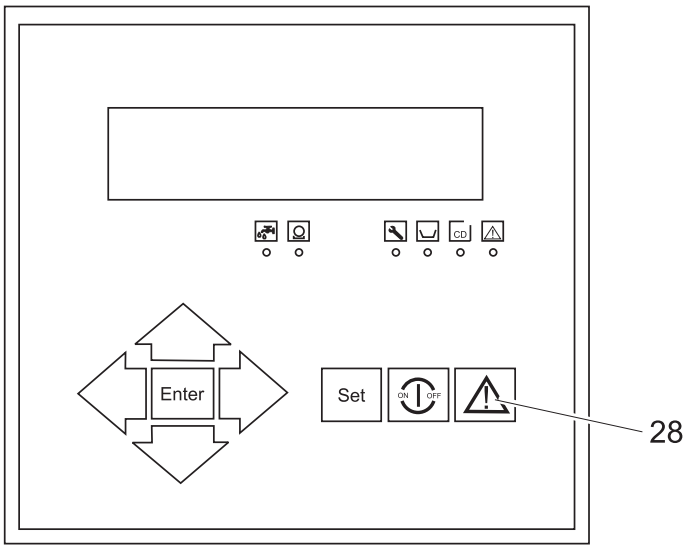
- The system stops; the “Motor protection“ malfunction indication is shown in the display.

This malfunction indication is shown independent of which metering container is empty.

- Fill the empty metering container and mix the chemicals according to Section 3.2.6.
- Unscrew the bleeding screw (41) by one turn.
- Press the MANUAL pushbutton (40) until the medium flows without bubbles through the bleeding line (42) back into the container.



- Screw in the bleeding screw again.

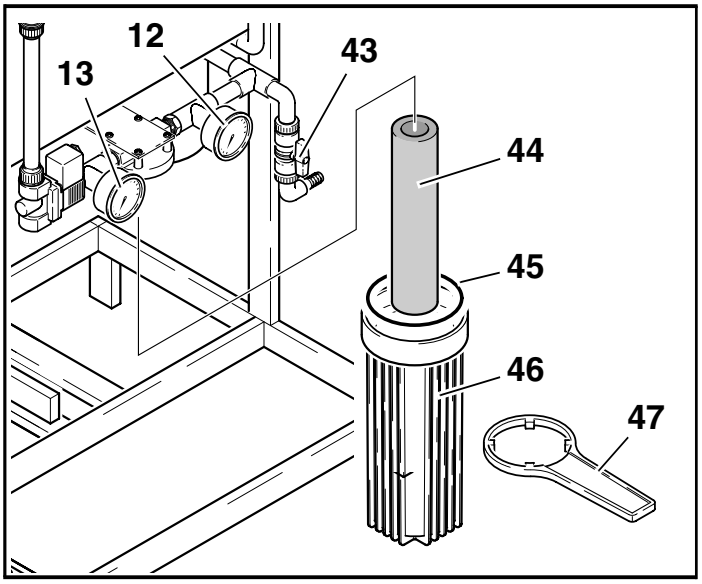


- On the control panel, acknowledge the malfunction indication with the RETURN key button (28); the system starts.

3.2.4 Replacing the Fine Filter

Check the pressure difference at manometers (12) and (13). Replace the filter insert when over 0.8 bar:

- Switch off the equipment with the ON/OFF button.
- Stop the untreated water supply.



- Start the equipment with the ON/OFF button, until the pressure on the preliminary filter is relieved.
- Switch off the equipment with the ON/OFF button.
- Attach the filter wrench (47) to the filter bowl (46) and screw off the filter bowl.

The filter bowl is still filled with water.

- Remove the filter insert (44) from the filter bowl and replace with a new one.
- Before screwing on the filter bowl, check the sealing ring (45) for damage, renew if necessary.
- Screw on the filter bowl and tighten with the filter wrench.
- Open the untreated water supply again and start the system with the ON/OFF button.

3.2.5 Fine Adjustment of the Operating Pressures

In case of alterations to the system adjustments, the following values must not be exceeded under any circumstances:

- Pump pressure(10) max. 7 MPa
- Quantity of drinking water (48) max. 600 l/h
- Quantity of concentrate (50) min. 1.200 l/h

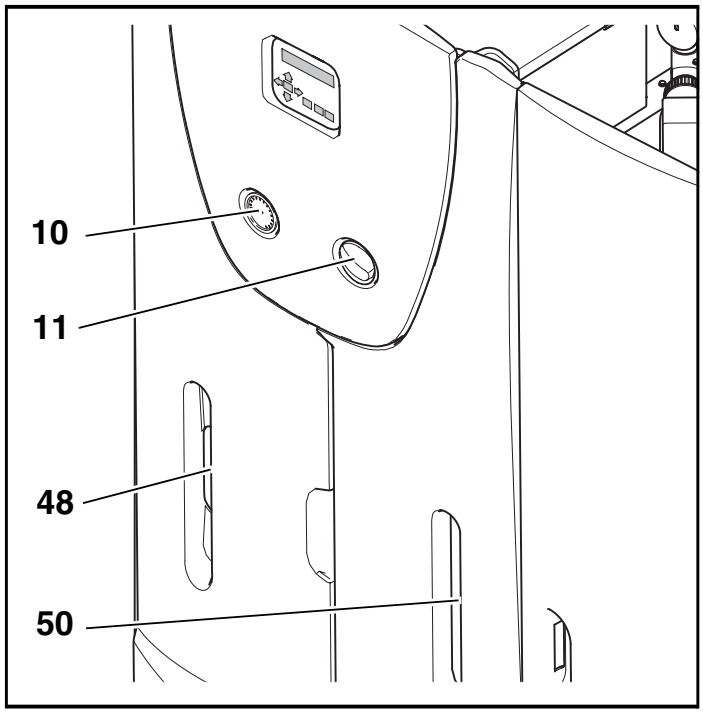
The equipment reacts temporally delayed of changes on the control valve. That's why adjust the control valve only in small steps and await the respective result.

(1) Flow of drinking water has decreased from _____ to _____ l/h

Read off the amount of drinking water at the flow meter (48) and compare with the value taken when starting operation (see operational start-up record).

If the flow of drinking water has decreased to _____ l/h , the following fine adjustment is to be carried out.
If the fine adjustment does not lead to an increase in the drinking water flow, the Kärcher Service must be contacted.

- Close the pressure control valve (11) slowly clockwise, until the target quantity at the flow meter (48) has reached.



(2) Conducting capacity of the drinking water has increased from _____ to _____ µS/cm

Small increases of the drinking water conducting capacity do not influence the drinking water quality.

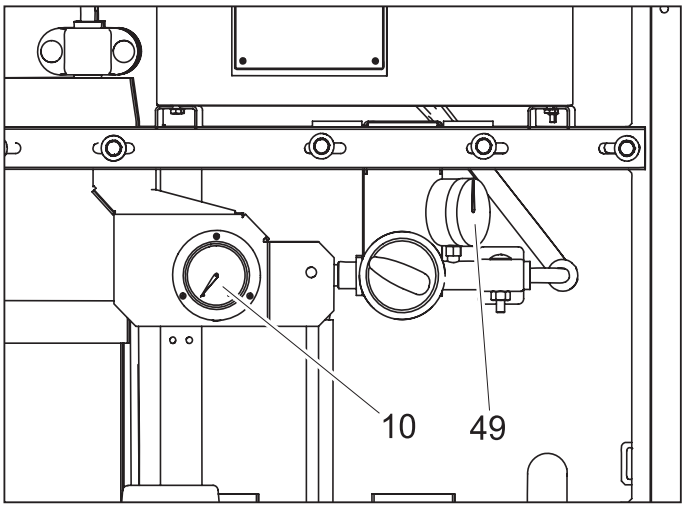
On the display of the control panel (9), read the current drinking water conductance value and compare with the value taken when starting operation (see operational start-up record).

Has the drinking water conductance value increased on _____ µS/cm, the membrane of the RO-filter unit must be rinsed. Is this not causing to a decrease of the drinking water conductance value, please contact the Kärcher Customer Service department.

- Reduce the drinking water capacity of approx. 200 l/h by opening the pressure control valve.
- Run the equipment for about 1 hour, then reset the capacity by closing the pressure control valve.
- Recheck the conducting capacity of the drinking water.

(3) The difference between pump and concentrate pressure has increased by more than _____ bar

- Read the values at the manometer for the pump pressure (10) and for the concentrate pressure (49), and determine the differential pressure.



- Compare the differential pressure with the value taken when starting operation (see operational start-up record).

If the differential pressure has increased by more than _____ bar, then the RO filter membrane is clogged. Readjustment is no longer possible.

Stop the drinking water production and notify the Kärcher Service.

3.2.6 Mixing the Chemicals

When working with chemicals, always wear protective clothing.

Values for the metering of the various chemicals result from the untreated water analysis and the system capacity.
Upon starting operation, the Kärcher service technician enters the required metering amounts for your equipment into the following metering table.

(1) Metering Table

Metering Container	Chemical	Item No.	Metered Amount of the Chemical **[ml]** per 10 l Metering Solution
Pre-chlorination	RM 852 sterilization agent *	6.291-772.0	
	Chlorinated lime *	6.291-505.0	
Pre-flocculation	RM 5001 10 l	6.294-703.0	
Anti Scalant	RM 5000 hardness stabilizer	6.290-991.0	
Post chlorination	RM 852 sterilization agent *	6.291-772.0	
	Chlorinated lime *	6.291-505.0	

* These chemicals can each be used alternatively

(2) Metered Addition

For mixing of the chemical, only drinking water from WPC 600 SW may be used.

The metered addition is carried out dependent of the level in the metering container.

Completely emptied metering container:

- Fill 10 l of drinking water into the metering container.
- With a measuring cup, measure the 7.5 -fold amount mentioned in the “10 Liter Water” column of the respective chemical and fill into the container.
- Fill the container with drinking water to the “75 l” mark and mix according to Section 3.1.2.

Partially emptied metering container:

- Read off the level of the fluid with help of the scale at the metering container, e. g., 35 l.
- Determine the quantity to be refilled by subtracting the read level from the 75 l.
  Example: 75 l - 35 l = 40 l.
- Determine the required amount of the respective chemical from the metering table.
  Example: 4 x the amount for 10 l water.
- Measure the determined amount of the respective chemical and fill into the container.
- Refill amount of water to the “75 l” mark and mix in accordance with Section 3.1.2.

3.3 Switching Off the Equipment

If the equipment is not operated for periods exceeding 14 days, it must be preserved by the Kärcher Service. Otherwise permanent damage must be expected.

- Press the On/OFF button, the equipment stops producing drinking water.

Never switch off the equipment overnight! Otherwise the automatic cleaning of the pre-filter is not carried through. Danger of damage to the equipment is given!

4 Consumption Materials

Product	Item No.
RM 852 sterilization agent 24 kg	6.291-772.0
Chlorinated lime 6 x 870 g	6.291-505.0
RM 5000 hardness stabilizer 23 kg	6.290-991.0
RM 5001 flocculation agent 10 l	6.294-703.0
RM 5001 flocculation agent 60 l	6.294-716.0
Filter element 5µ	6.414-466.0

5 Malfunctions

Malfunctions of the **RO system** are signaled with LEDs at the control panel (9) and indicated at the display.

In case of a malfunction, the system is generally switched off and the drinking water production is interrupted.

If the malfunction can not be corrected, stop the drinking water production and notify the Kärcher Service.

Is the equipment not starting from the automation mode, remove the plug out of the socket, wait 5 seconds and insert the plug again. In doing so the control is reset. Further faults remedy as mentioned in the following table.

LED lights up	**Display**	**Possible Cause**	**Remedy**
Maintenance		Maintenance flushing was activated manually	Await the end of flushing
CD	CD Permeat Max	Conducting capacity of the drinking water too high	Kärcher-Service
Error	Low water pressure	Row water pressure too low	Check row water supply • edificial-sided installation • Prepressure pump • Prefilter condition (paragraph 3.2.4)

LED lights up	**Display**	**Possible Cause**	**Remedy**
Error	Motor protection	• Motor protecting switch has stopped high pressure pump • High pressure pump is overheated • Metering station is empty	Check status of • Motor protecting switch • Filling quantity of all metering stations
Error	Exceed range CD	The measuring range of the conductivity measuring instrument has been exceeded	Kärcher Service
Error	Temperature low	Water temperatur under 1°C	Keep the system frost free
–	Standby	Drinking water tank is full	No procedure requested. Equipment starts automatically.
–	Flush	Automatic flushing is active	
–	Stop	Regeneration of sand and activated carbon filter is active	
–	Power failure set clock	Power failure during operation	Check current entry, adjust time

Malfunctions on the **admission-pressure unit** are indicated with the red LED (33) on the control unit of the admission-pressure unit.

Indication	Possible Cause	Corrective Action
Red LED lights	Untreated water supply disconnected	Check and reestablish the untreated water supply. After correcting the malfunction, press the “Reset” pushbutton (20).

6 Technical Data

Ambient temperature	+1°C - +60°C
Storage temperature (upon delivery)	-10 bis +70°C
Humidity	≤ 100% r.F.
Supply voltage	3 ~ 400 V 50 Hz
Pre-filter controls: prim./sec.	1 ~230 V 50 Hz 12 V 50 Hz
Metering pumps	1 ~230 V 50-60 Hz
Electrical protection	230 V/12 V 50 Hz
Connected load	220-240 V 50-60 Hz
Effective power consumtion	25 A
Minimum temperature of untreated water	6 kW
Maximum temperature of untreated water	+2°C
System intake pressure	+40°C
Capacity range	2-6 bar
Maximum drinking water supply	15000 l/Tag (±15%)
Dimensions: H x W x D	650 l/h
WPC 600 SW	1800 x 900 x 800 mm
WPC 600 SW-A	1800 x 1200 x 800 mm
WPC 600 SW-AM	1800 x 1200 x 800 mm
Weight, in delivery condition **(without filter fillings)**	
WPC 600 SW	220 kg
WPC 600 SW-A	240 kg
WPC 600 SW-AM	260 kg
Designed for untreated water based on a maximum salt content of	35000 ppm at 15°C
Max. salt content of raw water	60000 ppm

7 EU Declaration of Conformity

We hereby declare that the equipment described below conforms to the relevant fundamental safety and health requirements of the appropriate EU Directive, both in its basic design and construction as well as in the version marketed by us.

This declaration will cease to be valid if any modifications are made to the machine without our express approval.

Product:	**Water treatment plant**
Model:	**1.024-xxx**
Relevant EU Directives:	**EU - Machinery Directive (98/37/EU)** **EU - Low-Voltage Equipment Directive (73/23/EEC) amended by 93/68/EEC** **EU - Directive on Electromagnetic Compatibility (89/336/EEC) amended by 91/263/EEC, 92/31/EEC, 93/68/EEC**
Harmonized standards applied:	**DIN EN ISO 14971** **DIN EN 50178** **DIN EN 60 204 – 1** **DIN EN 55 011 : 1998** **DIN EN 55 014 – 1 : 2000 + A1: 2001 + A2 : 2002** **DIN EN 55 014 – 2 : 1997 + A1: 2001** **DIN EN 61 000 – 3 – 2 : 2000** **DIN EN 61 000 – 3 – 3 : 1995 + A1: 2001**
National standards applied:	**DIN 1988**

Winnenden

i.V. Reiser
S. Reiser

H. Jenner

Appropriate internal measures have been taken to ensure that series-production units conform at all times to the requirements of current EU Directives and relevant standards.
The signatories are empowered to represent and act on behalf of the company management.
Alfred Kärcher Kommanditgesellschaft. Sitz Winnenden. Registergericht: Waiblingen, HRA 169.
Persönlich haftende Gesellschafterin: Kärcher Reinigungstechnik GmbH. Sitz Winnenden, 2404 Registergericht Waiblingen, HRB
Geschäftsführer: Dr. Bernhard Graf, Hartmut Jenner, Georg Metz

5.957-716
06/05

Operations log WPC **(A) Startup date with transfer log**			
Plant type: 1.024-		Plant number:	
Startup date:		Installation site:	
Type of raw water source:		Customer:	
Operating hours display [h]		Raw water hardness [°dH]	
Flow rate of raw water [µS/cm]		pH value fo raw water [pH]	
Raw water temperature [°C]			
Media filter of inlet pressure during plant running [MPa]		Media filter of inlet pressure during return rinsing [MPa]	
Active carbon filter of inlet pressure during plant running [MPa]		Active carbon filter of inlet pressure during return rinsing [MPa]	
Inlet pressure of fine filter [MPa]		Outlet pressure of fine filter [MPa]	
Pump pressure [MPa]		Concentrate pressure [MPa]	
Drinking water quantity [l/h]		Concentrate quantity [l/h]	
Yield [%]		Drinking water flow rate [µS/cm]	
Dosing pump flocking stroke/ frequency [%]		Dosing pump pre-chlorination stroke/ frequency [%]	
Dosing pump anti-scalant stroke/ frequency [%]		Dosing pump post-chlorination stroke/ frequency [%]	
Remarks			
Confirmation: The plant was started up and handed over in a fully functioning condition. It has been explicitly brought to the notice of the customer that the watre produced by the plant must be checked according to the local standards by an approved testing agency before releasing it as drinking water. Further, it has also been brought to the notice of the customer that the operations log is to be maintained; the customer has also been informed about the risks involved in handling chemicals and the hazards on account of interchanging the chemicals.			
Place, Date, Signature (Customer)		Place, Date, Signature (Kärcher Service)	

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Operations log WPC

(B) Log report of operations data

KÄRCHER

Plant type: 1.024-	Plant number:
Startup date:	Installation site:
Type of raw water source:	Customer:

Date	Operator	Raw water values			Operations data						Drinking water values		Interruptions/ Remarks
									Counter for re-turn rinsing				
		Hardness [°dH]	Temperature [°C]	Flow rate [µS/cm]	Operating hours [h]	Pressure befor fine filter [MPa]	Pump pressure [MPa]	Concentrate pressure [MPa]	Media filter	Active carbon filter	Flow [l/h]	Flow rate [µS/cm]	

Log page____ **(Please make copies of this sheet after filling the header data for maintaining additional reports)**